Remarks

Claims 5-8 are now pending in this application. Applicants have amended claim 5 to clarify the claimed invention. Applicants respectfully request favorable reconsideration of this application.

Applicants submit herewith one sheet of corrected drawings to which the legend "Prior Art" has been added to Fig. 1. Applicants respectfully request approval of the corrected drawings and withdrawal of the objection to the drawings.

The amendments to claim 5 are supported by the specification at page 2, lines 26-27, and Figs. 1 and 7.

The Examiner rejected claims 5-7 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art (AAPA) in view of U.S. patent 6,313,614 to Persson. The Examiner rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of Persson further in view of U.S. patent 4,434,388 to Carver.

The Examiner asserts that page 2, line 11, through page 3, line 12, is admitted prior art. However, page 2, lines 11-15, clearly discusses the claimed invention. Along these lines, this passage states, "**This invention** is concerned with dynamic stability of a power systems. **The inventors propose** a dynamic feedback and feed-forward based compensation that aims at stabilization of the power grid. **This control structure** is intended to function as an emergency

control scheme, in other words, the control structure will be active in critical situations when the network is near voltage collapse." Clearly, this paragraph is discussing the claimed invention and not the prior art.

Additionally, page 2, line 35, through page 3, line 12, also discusses the claimed invention. This is apparent in that the heading "**Summary of the invention**" appears at the beginning of the passage. The passage is replete with language that makes it clear that the passage relates to the claimed invention. Along these lines, page 2 line 36, begins, "**This work** proposes a general method . . .". Additionally, page 3, line 1, states, "the **proposed** control structure is meant to operate." Furthermore, page 3, line 8, describes, "the method **of the invention**".

In view of the above, the passages in the specification relied on by the Examiner are not a description of the prior art, but rather a discussion of the claimed invention. Therefore, the Examiner's assertion that "measuring of the impedance of the line in case of dynamic instabilities" is incorrect. While the line shown in Fig. 1 may have an impedance, it is not measured. Additionally, the description of the prior art in the specification does not describe a change of the voltage reference. On the contrary on page 1, lines 19-20, describes how a reference signal for the reference signal for the integrator is the secondary voltage setpoint, which is usually kept constant at the desired secondary voltage.

Fig. 1 represents a type of system with which the claimed may be utilized. Traditional control of a transformer in steady state is described at page 2, lines 17-29. The known type of

control via the on-line tap changer is thus to try to keep the voltage on the load side of the transformer at a constant voltage reference, which is typically done through using an integrator. As is well known, this means that there is a deviation in the voltage on the load side from the voltage reference and the tap changer is controlled for minimising this deviation using integration, which is ordinary steady state control.

The claimed invention provides an improved method for controlling dynamic instabilities, such as line failure or an increase of power request from the load. In these cases, the claimed invention changes a voltage reference based on the measured line impedance, i.e. the impedance of the power line connected to the primary winding of the transformer. This is done because if there is a line failure, then the line impedance would change.

Persson does not suggest such a method. Rather, Persson suggests at col. 17, lines 60-67, that after a change of the sensed voltage, a correcting control signal is generated that restores the sensed voltage. This is in essence the same as regulating the sensed voltage to a reference voltage. In other words, Persson only suggests ordinary steady-state control. It is also clear that Persson suggests sensing the voltage (US) on the secondary side of the transformer, as shown in Figs. 1A and 1B, and as described at col. 8, lines 33-36; col. 8, lines 50-51; and col. 9, lines 40-41.

In fact, Persson suggests processing the measured secondary side voltage and the load voltage based on frequency. A peak value EPV of the secondary side voltage is combined with a reference value PVR. This is described at col. 10, lines 44 -53; and as shown in Fig. 2. An rms

value EEV of the secondary voltage may be combined with a reference value EVR for providing a control signal RCS for controlling the tap changer, as described at col. 16, line 44, through col. 17, line 5. The abstract further mentions that the control signal is formed as a deviation between the control quantity EPV and a given reference value PVR.

This means that Persson describes a variation of the traditional control, where the tap changer is controlled based on the deviation of the voltage at the secondary side of the transformer from a voltage reference. This secondary side or load voltage is processed based on frequency in the SAU and SSU units of TCC unit, as shown in Fig. 2. The processed voltage PVR is compared with a reference voltage EVR in the DGU unit in order to obtain a control signal RCS. The voltage references PVR and EVR are never described as changed by Persson or for that matter changed based on the line impedance. Additionally, it is clear that position generator TCCD is only provided for forming a position order RO based on this control signal, as described at col. 8, lines 26-32.

Persson does not suggest measurement of a system property such as current, power or voltage on the primary side of the transformer as in the claimed invention. Therefore, Persson does not suggest obtaining a value of line impedance.

While Persson also suggests measuring the frequency, Persson does not suggest where the frequency is measured. Furthermore, this measured frequency is only used to provide control components representing fundamental and harmonic components, such as amplitude and phase (u, ϕ), of the measured voltage, that is, of the load voltage at the secondary side of the

transformer, as described at col. 9, lines 14-42; and as shown in Fig. 2. The measured frequency is essentially used for splitting up the measured voltage on the secondary side of the transformer according to frequency components. Therefore, the frequency cannot be used for determining the line impedance on the primary side of the transformer. Therefore, Persson can be considered to suggest that the reference voltage is changed based on the line impedance in case of dynamic instabilities.

Furthermore, feed forward control or compensation and feedback control are not related to determining on which side of a controlled entity a controller is placed. It is thus irrelevant on which side of the transformer the unit TCCD (or rather TCC) is placed. The important thing is from which side the voltages, current or power used in the control originate. If a voltage, current or power used in the control is obtained before the controlled entity, the primary side of the transformer, then there is forward control or forward compensation. On the other hand, if the voltage, current or power is obtained after the controlled entity, the secondary side of the transformer, then there is feedback control. Since the TCC and TCCD units operate on voltages measured on the secondary side of the transformer, that is, on the load side, as described at col. 8, line 7, they are involved in feedback control and not feed forward.

In view of the above, AAPA identified by the Examiner is not actually prior art and, as such, cannot be used to reject the claimed invention. Additionally, the portion of the specification that actually discusses the prior art does not suggest the claimed invention. Furthermore, Persson does not suggest the claimed invention. Accordingly, Applicants respectfully request withdrawal of the rejection based on AAPA and Persson.

The combination of AAPA, Persson and Carver does not suggest the invention recited in claim 8 since, among other things, AAPA is not valid prior art and does not suggest the claimed invention. Additionally, Persson does not overcome the above-described deficiencies of AAPA. Furthermore, Carver also does not suggest the elements of the claimed invention not suggested by AAPA or Persson. Along these lines, the Examiner cites Carver as suggesting a feedback controller. A feedback controller does not suggest measuring the impedance of a line in case of dynamic instabilities and changing a voltage reference V_{ref} of the on-line tap changer according to a feed forward compensation from the impedance of the line. Therefore, the combination of AAPA, Persson and Carver does not suggest the invention recited in claim 8.

In view of the above, the references relied upon in the office action do not suggest patentable features of the claimed invention. Therefore, the references relied upon in the office action do not make the claimed invention obvious. Accordingly, Applicants submit that the claimed invention is patentable over the cited references and respectfully request withdrawal of the rejections.

In conclusion, Applicants respectfully request favorable reconsideration of this application and issuance of the notice of allowance.

If an interview would advance the prosecution of this application, Applicants respectfully urge the Examiner to contact the undersigned at the telephone number listed below.

The undersigned authorizes the Commissioner to charge fee insufficiency and credit overpayment associated with this communication to Deposit Account No. 22-0261.

Respectfully submitted,

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/Eric J. Franklin/
Eric J. Franklin, Reg. No. 37,134
Attorney for Applicants
Venable LLP
575 Seventh Street, NW
Washington, DC 20004
Telephone: 202-344-4936
Facsimile: 202-344-8300